AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry

VOL. 186. No. 21.
WHOLE No. 3825.

NEW YORK, SATURDAY, MAY 21, 1927

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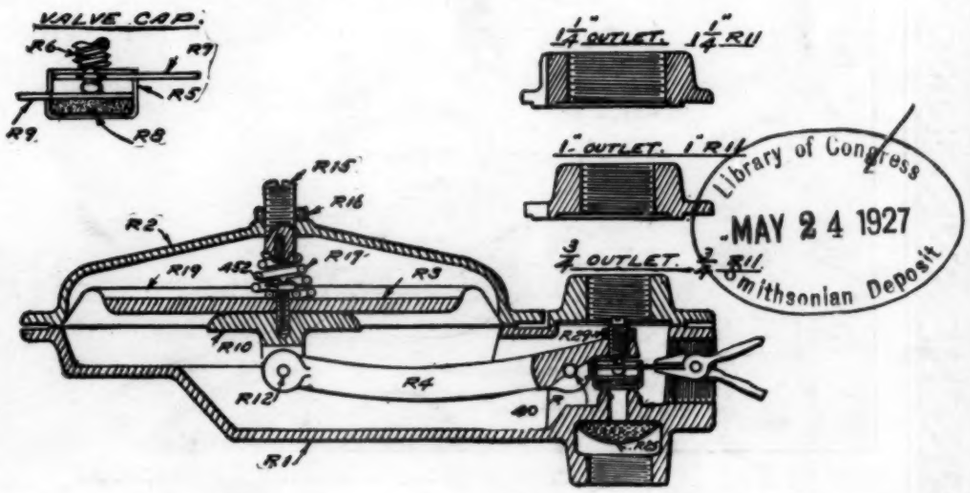

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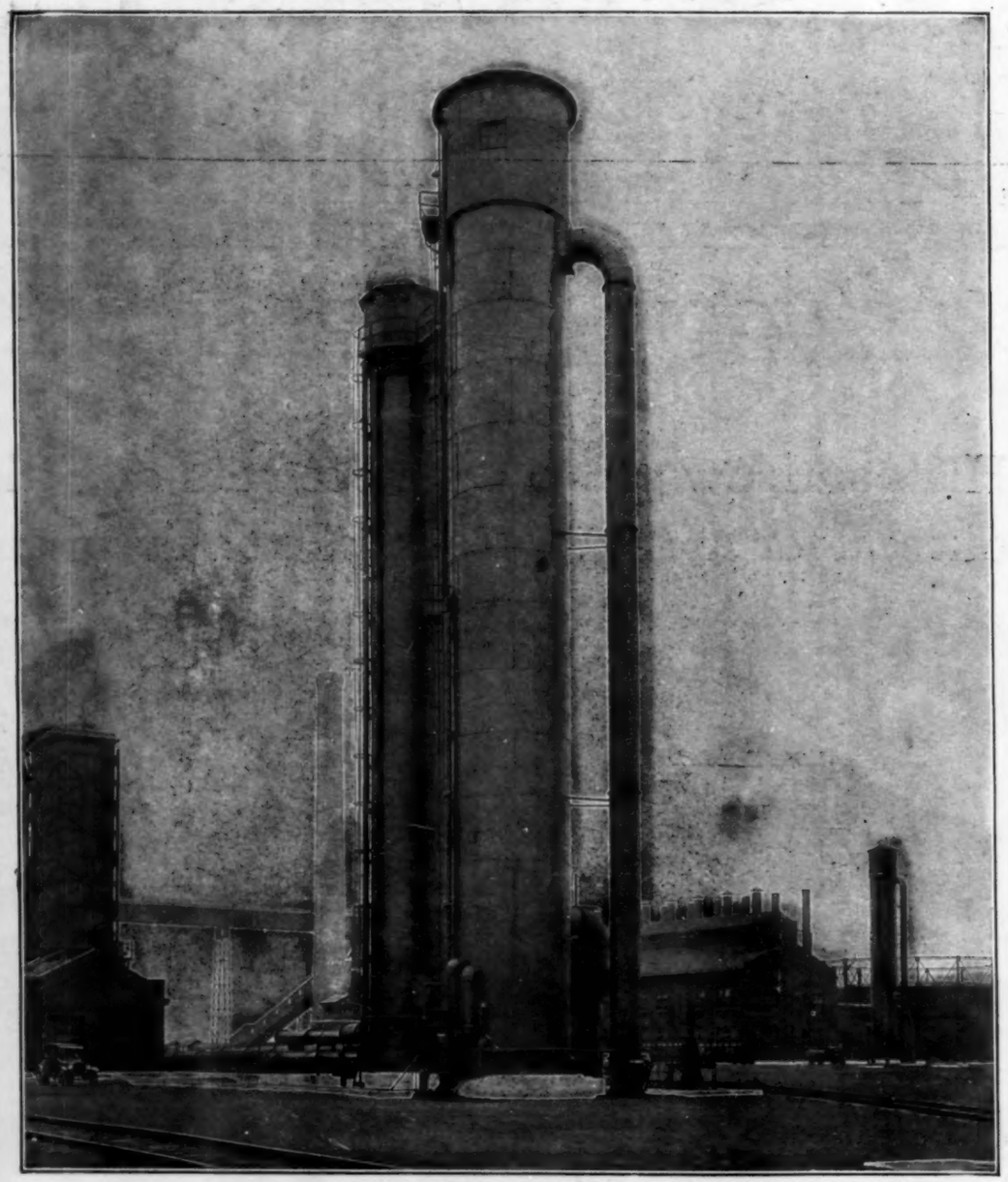

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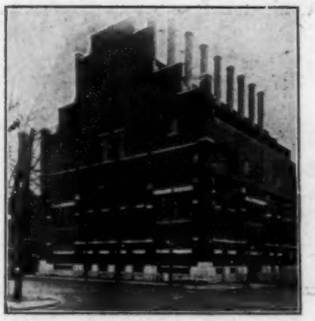

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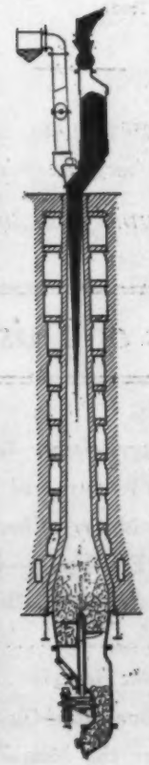

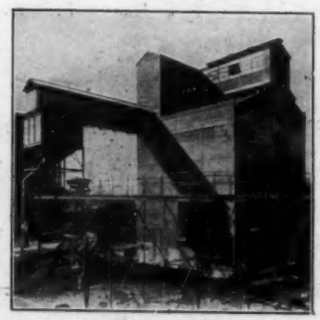

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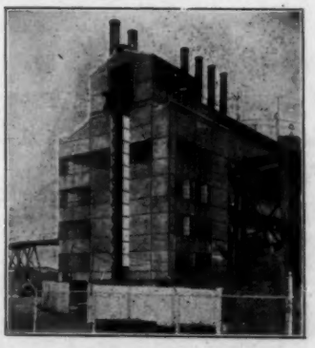

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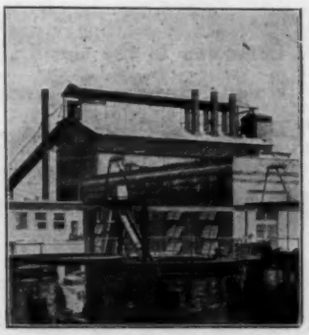

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American Gas Journal

SIXTY-SEVENTH YEAR

Published Weekly by American Gas Light Journal, Inc., 53 Park Place, New York, N. Y.
S. G. KRAKE, Pres. and Treas. A. M. GLEASON, Sec'y

STANTON G. KRAKE, Managing Editor HENRY M. RILEY, Editor
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Subscription $3.00 per year, including postage, in the United States, Mexico, Cuba, Porto Rico, Hawaii or the Philippines; in Canada, $4.00; foreign, $5.00—Single Copies, 10 cents.

AMERICAN GAS JOURNAL, MAY 21, 1927. Vol. 126, No. 21.
Published weekly by American Gas Light Journal, Inc., New York, N. Y.
Entered as second-class matter Jan. 9, 1917, at the post-office at New York, N. Y., under the Act of March 3, 1879.

AMERICAN
GAS JOURNAL
Established 1859— Pioneer of the Gas Industry

Vol. 126. No. 21 NEW YORK, MAY 21, 1927 Whole No. 3633

Corrosion in the Gas Industry

Consideration of some methods and agencies for retarding corrosion

Ismar Ginsberg, Associate Editor

WE have considered the general causes of corrosion and the relation that exists between them and the occurrence of corrosion in the materials and apparatus used in the manufacture and distribution of gas. The general theories of corrosion have also been explained and attention has also been called to the connection between both the composition of the metal and the manner of its working and the extent to which it will rust or corrode. The influence of chemicals has also been considered. It has been specifically pointed out that external influences are of more importance in determining not only whether or not a metal will corrode but also just to what degree corrosion will ensue. Finally, a certain amount of attention has been paid to the means that are available for preventing the corrosion of iron and steel, for these are by far the most important metals from the standpoint of protection against corrosion. The importance of selecting the right protective medium has been emphasized, and the various common paint pigments have been described in so far as their corrosion-protective properties are concerned. The use of these protective media, that is paints, has been considered from the viewpoint of the prevention of corrosion in the air.

Miscellaneous Protective Media

We must still consider the miscellaneous coating and protective media that are also recommended and used for this purpose. Some of these, as lacquers, are of no importance in protecting the iron and steel structures in the gas works against corrosion in the atmosphere. However, coating the metal with oxide coatings, a process which consists in heating the iron in certain media is of some importance. It is just necessary here to mention the fact that there are a number of different processes for producing this effect, and that at times the coating is of grater importance as a decorative means than as a real protection against rusting. Attention must also be called to the various colorings that are given to steel by treatment with certain chemicals as well as to the use of phosphate colorings.

Concrete as Corrosion Protection

There is one method of protecting iron and steel structures which finds considerable use in industrial plants and in gas works as well, although it may be used really to produce an entirely different result. What we refer to is the use of concrete to surround the steel structure. The reinforced effect that is obtained in this manner greatly increases the strength of the structure and the concrete is generally used for this purpose rather than to obtain a rust-protective effect. Nevertheless, it is true that the iron or steel member which is surrounded by a covering of concrete is well-protected against the corrosive action of the atmosphere, provided that the proportion of cement used in making the concrete is sufficient to fill up all the voids in the mixture. It is generally specified that not less than one part of cement should be used to two parts of sand and four parts of a good aggregate. It should not remain unsaid that it is advisable to paint the iron before pouring the concrete, for the reason that the concrete is porous to a certain extent and some corrosion will take place if the iron has not been painted. There has been some controversy over this point and certain evidence of the truth of this contention has been uncovered when old reinforced structures, in which the iron had not been painted, were torn down. Even if there is some uncertainty about the absolute correctness of this contention, it is nevertheless wisest policy to paint the iron before it is surrounded by the concrete, as the cost will be but small and the added protective effect of considerable value.

Various bituminous and pitchy substances, such as coal tar, asphalt and the like, have also been suggested as protective media, and they have at-

tracted considerable attention in the gas industry. There have been two purposes for which these preparations have been used, one in coating the gas holder, and the other in coating pipe which is placed in the ground. We will consider the latter use a little later and confine ourselves here to the discussion of bituminous coatings as a protection against corrosion of the gas holder.

The gas holder, because of its great size and great area of steel surface is more subject to corrosion than any other part of the gas works equipment. In fact, it is hard to find another piece of apparatus or structure which is of such importance to an industry and so subject to corrosion as the gas holder. It stands in the open and the weather beats down upon it on all sides. Furthermore, there is some difference of opinion as well as to the possibility of the interior of the crown of the holder and its sides corroding under the influence of the sulphur compounds that are contained in the gas. It is therefore readily understood that the protection of the gas holder against corrosion is a task of certain proportions, and it is unquestionably costly. Furthermore it is patently not a task that can be neglected, for holders are expensive apparatus and it would not do at all to allow them to remain improperly painted and open to destruction by the corroding influences of the atmosphere, etc.

It has been said in a previous article, in discussing the use of paints in protective metal against atmospheric corrosion, that the entire cost of the painting job can be divided into three parts, of which two are borne by the labor involved in painting and one-third by the paint itself. It was thus indicated that it was far cheaper to select the best quality of paint materials and use good labor in applying them than to try to save money by choosing inferior paints. How to reduce the cost of painting has always been an important consideration, and it is evident that if the labor cost of painting were reduced, there would be a considerable decrease in the cost of the entire job.

Automatic Coating of Holder Lifts

This gave rise to the idea of having the holder lifts, so-to-speak, "paint" themselves. This has been suggested and practical results of value have been gained by placing a certain amount of a bituminous preparation on the surface of the water in the holder cups and allowing the oily material to come in contact with the lifts, which become coated with it. Devices were also arranged whereby the bituminous substance was introduced into the interior of the gas holder so that the inner surfaces of the lifts were also lubricated or coated with this preparation. The cost of the preparation itself was said to be of no moment and the labor cost involved in its use naturally small. Its effectiveness has been claimed to be satisfactory and it would appear as if there is some value in the idea.

We need not here be concerned with the protective methods which involve the precipitation of a non-corrosive metal on the surface of the iron or steel, for they are generally too expensive to apply to structural steel or to the metal from which the various apparatus in the gas works are made. Nevertheless, there has been considerable interest expressed in the application of a metallic coating to the sides and crown of the gas holder by the Schoop process. There is no question but that the use of a metallic coating, which is itself not attacked by the corrosive agents in the atmosphere, will afford very effective protection for the underlying metal. The thickness of the coating is considerable and much more than that of a paint film. The important consideration is, however, the cost of the application of this coating.

Factors Controlling Under-Water Corrosion

In studying the methods of preventing corrosion of metal under water, it is essential to understand the factors that cause underwater corrosion. These have been explained in a former article. It was indicated as well that the rust which is formed on iron under water is soft and usually retains water of hydration. This rust is quite different from that which is formed on metal in atmospheric corrosion, for the latter is hard and dense. The decomposition of the metal is again of no great importance in this connection. On the other hand, one of the most important factors is the concentration of oxygen in the water. It has been found possible to slow down under-water corrosion to a considerable degree by cutting down the concentration of oxygen in the water.

Under-water corrosion is important to the gas engineer, particularly in the case of the holder lifts, which are under water part of the time. The water in holder tanks is at times circulated through a heater or circulated without any heating at all. The increase in the temperature of the water will, of course, tend to increase the corrosion of the metal, and this is also true as far as the effect of circulation is concerned. The movement of the water disturbs the status of equilibrium, with the result that increased corrosion ensues. This effect has also been noticed in boilers, hot water supply lines, condensers, etc.

General Methods for Prevention

There are three general ways in which underwater corrosion is prevented. In the first place there is the expedient of applying artificially a protective coating to the metal surface either in the manufacturing process or in the field. Paints are used for similar purpose, but they are not as satisfactory as when used on metal coming in contact with atmospheric corrosive influences. Metallic coatings can also be applied, as for example, zinc dipping. Bituminous preparations are also employed and reported to give good results. Coatings of cement are also used, as in the case of preventing atmospheric corrosion.

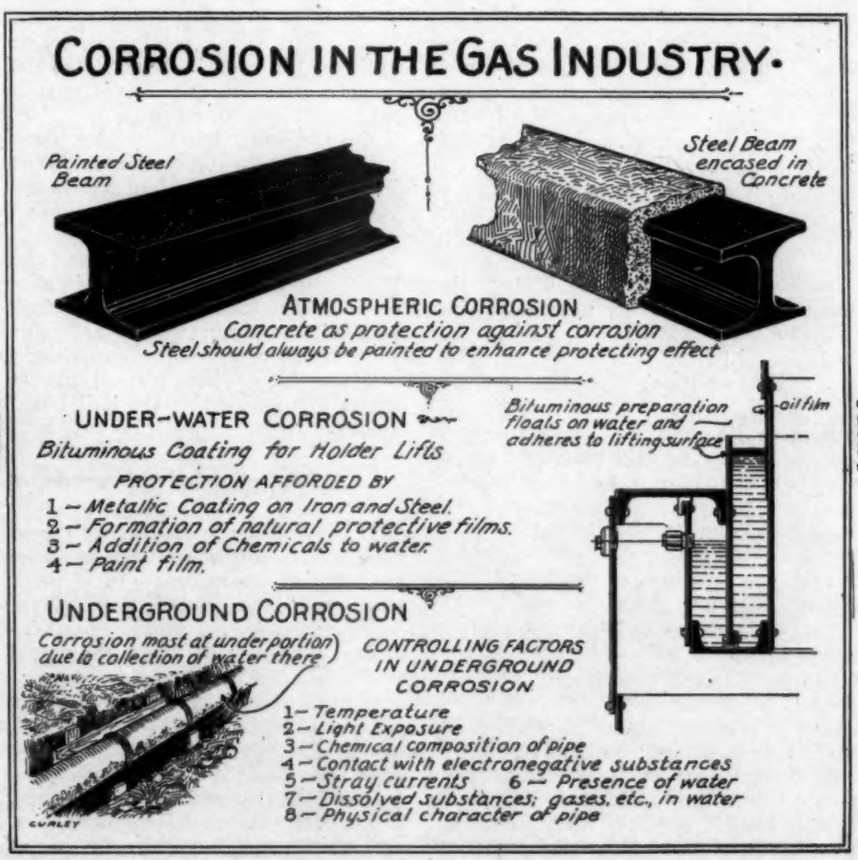
The second method consists in the formation of natural protective films. These ensue as the process of corrosion progresses and consist either of substances that are precipitated out of the water or by building up products of corrosion of the metal or

both. It is doubtful whether this method is of any importance to the gas engineer, for the constant lifting and lowering of the lifts of the gas holder does not give these products a chance to form on the metallic surfaces.

Use of Anti-Corrosion Agents in Water

The third method consists in treating the water by the addition of such substances as alkalies and addition of these and similar salts is not understood.

One phase of under-water corrosion which should interest the gas man is that which takes place in cooling systems or condensers. The primary, secondary and tertiary scrubbers in the gas works are subjected to this action. The rate at which the scrubbers are corroded depends on the temperature of the liquor and on the concentration of carbon dioxide, sulphuretted hydrogen and other gases in it that are drawn from the gas that is being purified.


CORROSION IN THE GAS INDUSTRY.
Painted Steel Beam
Steel Beam encased in Concrete
ATMOSPHERIC CORROSION
Concrete as protection against corrosion
Steel should always be painted to enhance protecting effect
UNDER-WATER CORROSION
Bituminous Coating for Holder Lifts
Bituminous preparation floats on water and adheres to lifting surface
oil film
PROTECTION AFFORDED BY
1 – Metallic Coating on Iron and Steel.
2 – Formation of natural protective films.
3 – Addition of Chemicals to water.
4 – Paint film.
UNDERGROUND CORROSION
Corrosion most at under portion due to collection of water there
CONTROLLING FACTORS IN UNDERGROUND CORROSION
1 – Temperature
2 – Light Exposure
3 – Chemical composition of pipe
4 – Contact with electronegative substances
5 – Stray currents
6 – Presence of water
7 – Dissolved substances; gases, etc., in water
8 – Physical character of pipe
CURLEY

the like, or the removal of dissolved oxygen and other corrosive constituents. These methods pertain particularly to the prevention of corrosion in boilers and the formation of scale. The gas engineer is, of course, interested in this matter, for every gas works has a boiler plant and it is necessary that this plant be operated at best efficiency. But we are limiting ourselves here to the discussion of corrosion in the gas works proper and so will not go into great detail on this phase of the general corrosion problem.

Alkalies will, of course, decrease the rate at which corrosion takes place in the under-water structures, and in this connection it is important to point out the use of alkaline hydroxides is more effective than that of alkaline carbonates or bicarbonates. The real nature of the process of corrosion prevention by the It is understandable that the general nature of this corrosion is quite different when the liquor is recirculated. The question of making the liquor alkaline is not so important in this case for the liquor is naturally alkaline and this has an important effect in slowing down the corrosion of the apparatus.

Underground Corrosion

Corrosion of metals under ground, as for example, the gas mains, etc., does not take place so frequently as corrosion under water or in the atmosphere. The reason for this is that there are but few soils that are strongly corrosive. Nevertheless, when it does occur, serious results are entailed. It should be remembered in considering under-ground corrosion that there are here many more factors involved than

either in under-water or atmospheric corrosion. This subject of under-ground corrosion is a very involved one and only the general principles will be touched upon in this article.

We are first concerned with the factors that influence soil corrosion. First of all there is the composition of the metal. The first fact that strikes us is that the life of under-ground piping has not been oves-estimated but considerably under-estimated. Gas pipe has remained underground for a great many years without going bad and having to be dug up and retired from service. In one large Eastern city, the total percentage and replacement of gas piping has been as little as 0.06 per cent, based on the annual replacement in any year. The actual figures were failures of nine thousand feet of pipe a year out of a total fifteen million feet of pipe in the ground. It is noteworthy that before being laid the pipes were given a coating of a coal tar paint.

On the other hand, there are localities in the United States where piping does not last anywhere as long as in this case. Thus the black gumbo soils of Louisiana are very hard on metallic piping, and soil near the seashore, containing salt water, also affects the piping to a considerable degree and results in more frequent renewals.

Life of Pipe

As far as the relative life of various kinds of pipe in the soil is concerned, it may be said that they are all long-lived. It is claimed that in some localities steel pipe can attain a hundred years of service, and that cast iron pipe is just as long-lived has been proven by the character of the piping, that was originally laid at the very start of the gas industry, at the time that it was removed, more than one hundred years later. Nevertheless, it is not correct to judge the life of piping just by a single test, for it is essential that the locality in which the pipe was laid and used be known as far as soil and climatic conditions are concerned. It is known to the writer that in sections that border the Atlantic seacoast the gas piping corrodes quickly underground, because of the peculiar soil and climatic conditions that exist there. This is, however, absolutely no criterion on which to judge the potential life of pipe in other and even in similar localities, for local conditions will vary and the life of the metal will vary likewise.

It is important before proceeding to a discussion of the corrosion problem as it specifically applies to the gas industry, to dwell at some detail on the general phases of soil corrosion. There is no question but that the gas engineer, he who is concerned with distribution, has to face a very important problem in soil corrosion. A correct understanding of the conditions that surround this phenomenon may at times help in the selection of the proper method whereby it may be successfully combatted.

Physical and Chemical Characteristics of Soil

At the outset it must just be mentioned that both the physical and chemical characteristics of the soil are of great importance in determining its corrosive action. It is really, however, a very difficult, if not entirely impossible, task to determine just why some soils are corrosive and others are not, or some more corrosive than others. Empirical knowledge seems to be the only kind that can be relied upon. In other words, to determine whether or not a soil is corrosive it only remains to test the soil by actual experience.

But a study of the properties of soils reveals some facts which can lead to substantially correct conclusions on their corrosibility. First, as far as the physical properties of the soil are concerned, it is important to consider its porosity, which means the ease with which it retains water, its power of adsorption on the metal surface, its conductivity and the contact effect produced by dissimilar solid substances which are contained in it.

On the other hand, the chemical properties of the soil pertains to the character of the dissolved matter in it and the variation in concentration of these substances. There are various soluble substances in soil, for example, dissolved gases, derived from the atmosphere, such as oxygen, carbon dioxide and hydrogen sulphide, substances such as dilute acids, bases and salts. The latter include particularly the alkalies, calcium sulphate, magnesium sulphate, sodium chloride, magnesium chloride, sulphuric acid and the like. There are, of course, various organic matters contained in the soil both of vegetable and animal origin.

High Corrosive Ingredients Present

It is easily understood that the soil contains materials which can readily effect corrosion of iron under the proper conditions. It is, of course, necessary that water is present, for soil which is absolutely dry has no corrosive action. On the other hand, it is also common knowledge that pure water will not corrode iron, but the rain water seeping into the soil finds plenty of chemicals there to dissolve and the solutions thus formed have decided corrosive action on the metal. It must also be remembered that rain water will itself contain corrosives, chemicals which it washes out of the air, and in this case the concentration of these corrosive chemicals in the soil water will naturally be increased with subsequent acceleration of the corrosion phenomenon. In fact, that water is of great importance in soil corrosion is amply proved by the appearance of corroded pipe removed from the ground. It is always found that the lower portion of the pipe is more corroded than the upper, for the reason that the water collects at the lower portion.

We must consider the natural corrosion-preventing action of the soil itself. This is not of chemical nature at all but rather a physical action. We refer to all cases except where the soil is naturally alkaline, whereat corrosive acids would tend to be neutralized. Sometimes soils contain clays and other colloidal substances, and these will at times collect on the surface of the piping and form a more or less impervious layer on it which tends to prevent the water solutions from reaching the metal and producing corrosion. The natural protection is somewhat simi-

lar to what happens in atmospheric corrosion and consists in the formation of a coating on the surface of the metal which effectually protects it.

Important Controlling Factors

In discussing soil corrosion it is therefore evident that we have to consider the same factors that are important in atmospheric corrosion, together with certain others that are peculiar to the former. Thus the question of dissolved oxygen is important, for when oxygen is present in the soil water, it always accelerates corrosion of the metal. On the other hand, it must not be assumed that the absence of oxygen will prevent corrosion, for instances have been found where this condition existed but where nevertheless, no corrosion took place. The origin of the oxygen in soil water is easy to explain, for it comes from the atmosphere through which the rain water passes.

The presence of salts, such as sodium chloride, magnesium sulphate and others in the soil, always tends to accelerate the corrosion phenomena. Carbon dioxide is also an important element in corrosion, for when this gas is present, the hydrogen ion concentration of the soil is materially increased. Its influence is, however, often farther-reaching than this, for it is known that carbonated waters are solvents for calcium carbonate as well as the carbonates of iron and magnesia, which substances are often found as natural coatings on the iron pipe, affording it some protection against corrosion. When these are dissolved off, the naked metal is again subjected to the action of the corrosive agents.

Effect of Dissimilar Substances

The possibility of dissimilar materials being placed in contact with one another and giving rise to severe local action is always present in the average soil. This pertains principally to the nature of the soil, the character of the ingredients contained in it. Thus the presence of patches of iron oxide is likely to produce local action due to their cathodic character. Experiments have been made with different soils which were filled into a trench in which a pipe line was laid, and it was found that a current of electricity was produced under these conditions which had a very important action in accelerating the corrosion and destruction of the metal.

There is, furthermore, the question of the electrical conductivity of the soil. This is also an important condition as far as local action is concerned. It is understandable that the electrical conductivity of the soil will be governed by the concentration of substances in it which are conductors of the electric current. We refer, naturally, to the quantities of salts and other electrolytes. It has been proven by experiment that the soil which had the highest electrical conductivity seemed to produce the most rapid corrosion. An instance is cited in Speller's book on corrosion referring to gas mains which had been laid in one case in practically dry soil, with a water content of only four and one-half per cent, and in the second case in soil which contained from twenty to thirty-five per cent of moisture. The pipe in the second case corroded much more rapidly than in the first case.

Soil Corrosion Very Complicated Matter

We have now discussed in some detail all the various factors that apply to the corrosion of piping and other metal structures located underground. It must not be assumed that this discussion has revealed the real character of the corrosion phenomenon, for, as mentioned right at the outset of this discussion, the causes for soil corrosion are often very hazy and are not detected even after most careful study. There may be additional factors which are also of importance in influencing the corrosion of underground piping, but it is a frank statement that these are not yet known or understood. The matter is easily one of the greatest importance to the gas company, for a large portion of its investment is in the form of underground piping and mains. It is anxious to maintain this investment intact for as long a period as possible, and this means that the proper means must be selected to protect the piping against the various corrosive influences that are always present in most soils. The proper understanding of the character of the soil is patently important in advising the distribution engineer of the seriousness of the corrosion problem in one locality or another. For it has been found that the soil that is light and sandy and therefore retains but little water will be far less corrosive than the one which is heavy and loamy and contains acids, alkalies and salts. If the engineer engages the services of the chemist to analyze and tell him what the character of his soil is, he may be able to tell in advance what precautions he has to take.

Still, the engineer must be warned that he must not accept a soil analysis and the information that it pretends to give without correlating this information with actual practical experience with similar soils. It is an unfortunate state of affairs that chemical analysis cannot lead to the conclusion as to which soil is good or which is bad, but it does help to a certain extent in showing at least what is present in the soil. The situation may finally be summed up as follows: Little is known about the causes of soil corrosion, and what is known has not enabled the engineer as yet to determine beforehand the exact character of the action of the soil on iron in the form of underground iron piping, or on steel. He still has to rely mainly on empirical data, gained by actual experience, and select what means seem best to him under the conditions at hand, to prevent his pipe lines from being rapidly corroded and destroyed.

Conclusion

In summing up the various conditions which seem to hasten the corrosion of iron and steel pipe, it may be said that first comes the temperature, which always has an influence in accelerating chemical reactions. Then there is the quantity of light that falls on the pipe, which infers exposure to the atmos-

phere. Then the chemical composition of the pipe, that is the character of the metal, a matter which has been shown to be of minor importance as compared with external corrosive agents. Then the contact with electronegative substances which gives rise to local action. The passage of stray electric current is also important, a matter which has not been discussed but which will receive special attention later. Then the presence of oxygen or carbon dioxide in water that is in contact with the pipe itself, the rate of motion of the water in contact with the pipe, inferring that the greater the motion the more the products of corrosion will be removed, the equilibrium being disturbed and further corrosion promoted. The presence of acids, alkalies and salts in the water, the presence of previous rust, which may accelerate corrosion as a catalyst, and finally the physical condition of the pipe are also factors.

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UNIQUE FURNACE AT CARNEGIE INSTITUTE OF TECHNOLOGY

Variety of Fuels Can Be Tested with the Equipment

The equipment represented by the accompanying illustration was installed by the Carnegie Institute of Technology, Pittsburgh, Pa., to be used in connection with courses in heat and combustion engineering. During the school year 1926-1927, a course of this nature was given to graduate students, most of them being combustion engineers of the Pittsburgh district. The equipment will be used from now on in the new day course of heat engineering which is given in the Mechanical Engineering Department by Professor W. Trinks.

Combustion Tunnel, Carnegie Institute of Technology

The majority of mechanical engineers think of combustion with reference only to combustion in the boiler furnace, whereas the field is very much larger, since it refers alike to industrial furnaces used for heating and those used for melting and refining metals, glass and other substances.

Description of Furnace

The principal part of the set shown in photograph consists of an oblong furnace to which various kinds of burners and combustion devices can be attached at one end. It is provided with observation holes through which flue gas samples can be taken and through which temperatures of the flame and of the furnace walls can be observed. Above the rear end of the tunnel there is a "Calco" recuperator by means of which the combustion air can be preheated to about 800 deg. F. The piping and blast ducts are so arranged that the furnace can be supplied either with cold air or with hot air. In the former case the hot air goes directly to the stack so as to protect the recuperator from being burned out. A "Carborundum" recuperator with "core busters" is being installed at the side of the furnace. This recuperator is designed for preheating the air to a very high temperature.

Instruments have been provided for measuring temperatures and for analyzing fuel as well as flue gases. All fuel and air quantities are being measured.

Natural Gas Used as Fuel

At the present time natural gas serves as fuel, but pumping and heating equipment is on the ground for using oil and tar as fuel and is now being installed. The mechanical laboratory also has a gas producer so that studies can be made with producer gas. Arrangements are furthermore being made to remove the "snout" or flared section which lies between the burner proper and the combustion tunnel and which is plainly visible at the right hand end of the picture, and to replace it either by parts of high temperature furnaces or else by grates and stokers for the purpose of studying the combustion of coal and of the gases rising from the fuel bed.

It is believed that this is the only combustion tunnel installed in any university or college in the United States.

The combustion equipment at Carnegie Tech should produce valuable research data.

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35% OF HARVARD'S FUNDS INVESTED IN PUBLIC UTILITIES

In the general investment funds of Harvard University, representing a total of more than $61,000,000, over $21,000,000 (or 35%) are invested in public utility bonds and stocks other than steam railroads. Including steam roads, the total of its public utility securities represents more than 58% of the entire investment.

In the past five years the amount of the general funds has increased 50%. At the same time the amount invested in public utility bonds has increased from about $8,000,000 to nearly $18,500,000, with an additional $2,282,000 in public utility stocks, making the total investment in these securities $21,341,000. Railroad bonds and stocks total $14,222,000, or more than 23% of the total.

Dollars and Cents in the Gas Meter*

Slow and faulty meters are a liability

Charles Leech

General Superintendent, Macon Gas Co.

THE dollars and cents in the gas meter are very pertinent to the industry from the fact that the gas meter measures the entire income of the gas company as far as its primary motive business objective is concerned.

Until ten years ago very little had been written on the subject of the gas meter, and hardly any constructive work had been done by any of the gas associations in acquainting the industry with this important subject. During the last decade there has been considerable activity along this line by the American Gas Association and various other associations throughout the country. Foremost of this activity, and probably that which has done the most good for the smaller companies, has been the meter schools that have been held at the Iowa State College and the one held under the auspices of the Southern Gas Association. There is no question that the men that attended these schools benefited by the knowledge and experiences of the instructors, and, in turn, the companies who sent these men were benefited. Speaking for the companies in the South, for the past few years there has been a marked improvement in the gas companies' meter shops, equipment and methods. It has been gratifying to note the interest that has been taken in the meter school by a few of the men in the gas industry who are not directly concerned with the maintenance of their meters, but realize the importance the meter plays in their business. It is the purpose of this paper to attempt to further this interest to everyone connected with the gas industry because there is no question that the company itself and all its employees are affected directly by the accuracy of its meters. I am, therefore, taking the suggestion of one of our members and intend to discuss only "Dollars and Cents in the Gas Meter."

Unaccounted for Gas

Every company has a discrepancy between the amount of gas that is sent out from the plant and the total of its customers' meter readings. This discrepancy is usually called "Unaccounted For."

Statistics taken from Brown's Directory show that of approximately 10,000,000,000 cu. ft. of gas produced per annum, in seven (7) Southern States, 14 per cent is lost or unaccounted for.

Gas men as a rule do not like to discuss "Unaccounted For." It is something intangible and hard to explain, yet the fact remains that not one penny in revenue is received by these companies for this 14 per cent.

We admit that "Unaccounted For" is hard to explain. We have seen much money and time spent in the effort. We do know, however, that slow and stopped meters are responsible for part of the loss. It is this part of the "Unaccounted For" which should demand our special attention, because it represents the loss of the full selling price to the consumer and not the manufacturing cost.

Taking a conservative estimate that only 3 per cent of the loss is through slow or stopped meters, then there is given away, absolutely without cost to the consumers of these seven Southern States, a half million dollars worth of gas each year. Lumping it all together, it represents approximately the whole of the production and gross revenue of a company the size of the Savannah Gas Company.

We are at the present time entering upon a period when it will be more important than ever before to have our meters accurate. The time is past when by the small consumption of our customers we could tax them by rate for our slow or stopped meters.

Slow Meters Will Not Be Tolerated

The program of extension we set ourselves to attain to supply all of the heat for domestic purposes and a considerable portion of the industrial business, can only be obtained by a rate that is competitive with other fuels. This rate cannot be made on the basis of materially reducing manufacturing costs. The present costs will probably prevail for many years to come. It is only by a tremendous increase in the volume of sales that the overhead will represent but a small part of the cost that we can make rates to obtain this business. Figures will be cut so close that slow or stopped meters will not be tolerated, and the return on the investment of our companies will be entirely dependent on their accuracy.

The larger companies will have no difficulty along this line; they have well organized departments and statistics of the behavior of their meters under local conditions and are well alive to their responsibilities.

With the smaller companies it has always been a difficult matter to acquire the services of a competent organization that will assure the maintenance of its meters near the accuracy mark. Fortunately there is a tendency to group these companies under heads in which they will have the benefit of qualified organizations with facilities to insure the accuracy of their meters.

A study of the meters in various companies reveals the fact that there are many factors, probably

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*Read at 19th Annual Meeting, Southern Gas Association, Atlanta, Ga., April 19, 20, 21, 1927.

different in each company, that have a bearing on the life of a meter's accuracy. The kind of gas, the heating value, ammonia, hydrogen sulphide, and oxygen content—all have some effect on the leather diaphragm. It has been found that ammonia and hydrogen sulphide have a very destructive effect and there is no doubt that a close scrutiny in seeing that these substances are removed at the plant will do much to prevent losses, in dollars and cents, from slow or stopped meters.

Reports Should Be Studied

It is recommended to those that are responsible for their company's meters to study the various reports on the subject of the Chemical Committee of the American Gas Association, and, also, the valuable contribution to the subject, "A Discussion of Some of the Causes of the Deterioration of Gas Meters and Gas Meter Diaphragms," by W. H. Fulweiler before the Eastern State Gas Conference of 1923. This paper has been published for general distribution by Helme & McIlhenny, the meter manufacturers. No set rule can be made that will apply to all companies on how long a meter should stay in use before being tested or repaired. Mr. H. A. Norton in his pamphlet on "The Four Cardinal Points" recommends that a seven year periodical test and a fourteen year periodical repair date be adopted.

Mr. Norton, whose profound knowledge of the meter we respect, bases his judgment on the statistics of companies that have been well organized and have been using approved methods for years. In the South it has only been a matter of a few years that the importance of protecting the interior of a meter against corrosions has been given much thought. Not long ago I received a communication from a manager in a Florida property wanting to know why his meters went dead with only two years' use. While, of course, this is an exceptional case, yet there are many companies that would be out of business long before Mr. Norton's first test period came around.

In a property where there is any suspicion that the meters may have been affected by impurities, the quickest and most economical method is to test the meters in-situ for small-flame registration.

A survey of this kind is to be particularly recommended of a holding gas company. I refer to lost confidence in the meter and the company can test 2,000 meters, and tell the story of whether or not the company is receiving the amount of money it is entitled to.

Explaining High Bills

Aside from the direct loss in dollars and cents from slow and stopped meters—there is another loss that has a bearing on the success of a gas company. I refer to lost confidence in the meter and the company by the consumer. Each one of us had the difficult and embarrassing task of trying to explain a high bill when a slow meter has been replaced by a meter measuring accurately, and we know that apparently the consumer is not at all satisfied with our explanation, in spite of the fact that he has been paying less for his service than he should. At this point a word should be said for the person in the office who ferrets out these slow meters. No system of periodic meter changing and testing can possibly catch every meter before it goes slow, and the company that is fortunate enough to have a person in charge of the customers' accounts that will discover a slow meter before it has had a chance to materially cut into the revenue—is to be congratulated. In this age of speeding up with mechanical bookkeeping devices, I trust the value of this kind of employee will not be lost sight of and that sufficient time will be given them to scrutinize the customers' accounts as they have in the past.

In the paper dealing with dollars and cents in a gas meter some mention should be made of the purchasing price. It is a remarkable fact that unlike most every other commodity there is not a cheap meter made. When I say cheap, I mean the quality cut to sell at a low price. Considering the material used, the skillful labor required, and the expenditures in research work that have been made, I think we are agreed that value is received for the dollars and cents invested in them. A comparison of prices with other domestic commodity measuring instruments shows favorably to the gas meter.

Meter Development Has Progressed Slowly

It is also a remarkable fact that the original designers and manufacturers of the gas meter evidently builded better than they knew in applying the principle of the reciprocating engine for its basic operation. Paradoxical as it may sound, the meter manufacturers have made the most progress by standing still. Many improvements in details of construction have been accomplished, but the principle of operation has not changed since 1844. The greatest advances that have been made, and fortunately these have been made conservatively, are in the increased hourly capacity without increasing the resistance offered by the meter due to the passage of the greater volume of gas through it. This development has been of the utmost importance to the present day gas companies and gas consumers, as it has enabled a decided saving to be effected in first cost of the meters, in their maintenance, and in the space required on the consumer's premises for the metering of the comparatively large volumes now used.

In conclusion, emphasis should be made to the necessity of keeping a complete meter record, and I commend for your consideration an article written by Mr. I. R. Jones, of the Alabama Power Company, entitled "Keeping Both Eyes on the Meter," which appeared in a recent issue of the A. G. A. Monthly. Many dollars and cents can be lost by meters going astray through an incomplete system of work orders and many dollars and cents can be saved by keeping a history of your meters that will show whether or not you are getting the life out of a meter that the manufacturer put into it.

Education of Gas Company Employees*

Proper training will eliminate many complaints and result in money saved for the company

Frank B. Lachle
Southwestern Gas and Electric Co., Shreveport, La.

THE business concerns of today are demanding more and more that their employees be trained in the especially appointed work which is being done. No one can be efficient if he is groping in the dark. But given certain elementary information, letting it develop as the case is applied, and it is not an uncommon occurrence for a day laborer to become a valuable employee.

For the mutual benefit of employer and employee classes everywhere are being formed and taught, thereby enlightening the employee as to what he is trying to do, and why he can do it better a particular way. Lectures and round table discussions are held and an untold amount of information is digested by the inquiring mind. District associations are organized and to these meetings are sent representatives who have acquired a knowledge of their work and have helpful suggestions to give—as well as being desirous of receiving new ideas.

Men Must Be Trained

When serving the public the best must be served or else the public refuses to accept. But how can one serve if one does not know how? And how will one know how if he is not taught? Consequently it is of great importance that public utilities have trained and efficient men even to its most menial laborer.

The ultimate value of education of the employees of our public utilities is measured by its financial result to the company. The better and more efficient work which is done resulting from instructed classes produces outstanding results. Quicker and better service will be rendered, more work will be accomplished by fewer men, advanced ideas brought into use by applied knowledge after a series of well-given lectures. The employee takes a more personal interest, shows a more loyal spirit, becomes more and more one of the company when he begins to know what it is all about.

Then, too, there is more or less danger involved in all phases of operations. The untrained operator is much more liable to accidents than a trained laborer. He takes many chances and risks entirely unnecessary, not realizing the danger to which he is subjecting himself. Statistics taken under supervision of Martin J. Insull show that from an analysis of 20,000 accidents from various forms of business operations only 12.8 per cent can be traced to the fault of defective machinery. Millions of dollars are being spent every year on safety devices for protection and prevention against the unavoidable accidents. Machinery, tools, and implements of all kinds are constantly being improved to save the careless operators from dangers involved.

Great Number of Accidents Due to Ignorance

These astonishing statistics show that the 87.2 per cent balance is due to sheer carelessness and ignorance of the individual worker. What is being done about the 87.2 per cent? What is being done to correct the carelessness and ignorance of the human element? Until very recently practically nothing had been done to train the mind in the business it should know. The above mentioned classes which are giving instructions to thousands of employees in all lines of operations is the greatest step for the elimination of this enormous percentage of useless accidents.

In our own specific line of work—that of the Southwestern Gas and Electric Company, there are innumerable mistakes occuring daily that a bit of enlightened information would greatly lessen. The expense of leaking meter complaints is mostly caused by inefficiency on some workman's part. The meter loop may have been unlevel, placing meter in a strained position. The loop may be strapped to the wall in a strained condition, and when the meter or loop receives a slight jar will pull itself loose and break the meter neck, thereby causing unnecessary leaks and meter repairs. Or the meter repair man may be inefficient. He may solder the sides of a meter with them being forced into position. When this meter undergoes contraction or expansion by sudden change of weather temperature, the sides of the meter will be ruptured, causing a leak to occur. Low and high pressure complaints may be caused by the man who repairs regulators. Regulators not put up properly will stick, or possibly have a small hole in the diaphragm which will cause these complaints. It is also necessary to have the right length set screw as well as have a man who can install this regulator properly.

Various Troubles Due to Faulty Workmanship

Leaking mains may be caused by not packing a main right, not having the proper support in soft soil, not being buried deep enough in road-crossings. These complaints are expensive in that they waste much gas, and considerable labor is used in making repairs. Leaking services, like leaking mains, are sometimes unnecessary. Stove readjustment complaints, over-read meters and things of this kind run into big money. Then there is the ever present danger of gas leaking in a confined place. This should be carefully guarded against as gas is an explosive and is always ready at any ignition to explode. These fires not only burn up valuable material, which must be paid for, but may injure someone who might be standing near. This would subject the company to expensive lawsuits. Safety protective

*Presented before the 32nd Annual Convention of the Southwestern Public Service Assn., New Orleans, La., April 26-29, 1927.

devices would be out of the question here, as in almost every other accident caused by the human element.

With a crew of trained men out setting meters, running complaints, adjusting stoves, etc., there is a great opportunity for public relations. These men come in direct contact with thousands of consumers every month and can easily break or make a friend for the company. The ordinary working meter-setter or trouble man can not answer the questions of the public properly without a clear insight into the gas business. He must know the different departments of his company as well as the principles and fundamentals of gas and its laws. Again there is the expense of inefficiency of gas appliances. The average consumer knows nothing about proper or improper combustion. He may be using 50 per cent or more gas than is necessary if he had proper combustion. There are a great many different types of burners, and complicated adjustments are sometimes necessary. If an appliance does not work efficiently that heats with gas, there will be a field open for competition for an appliance that will burn or heat efficiently, maybe in some other commodity as electricity or coal. Gas we believe is the cheapest heating fuel. It is also clean and convenient if used and installed right. But where it is not used properly it may be more expensive than some other inferior fuel which is used right. In showing and doing for the public, friends for the company will be made, which in time may prove powerful, especially in time of election when a new gas company seeks a franchise. A company with a good reputation and many friends will defeat this franchise. If it does not have these things it will suffer the consequences by sharing its profits and not its expenses with another company.

Advantages of Outline Study

To do away with this ignorance and carelessness it must be shown to the employees the advantage of information. A class of instruction may be formed meeting once each week during working hours and all employees required to be present. The shortest, easiest, and most resulting form of study is by outline. To make an outline filled out in every detail, one must know the subject he is outlining. To study by an outline is much easier. The facts are brought before the student in a condensed, systematic arrangement. His mind is not muddled by switching from one subject to another. In teaching an outline care should be taken not to deviate from the train of thought. To elaborate on points covered by the outline is important and instructive. An instructor should be the one who is capable of doing same. To leave one subject in order to talk or teach another is only serving to confuse the student's mind.

Practical Method for Training Gas Company Employees

Systematic arrangement of outlines where natural gas is being used:

1—Gas fields, their origin and depletion. High pressure field lines, their construction and uses.
2—Booster stations and put-in stations, their purpose and construction.
3—City pressure regulating stations (buildings and pits).
4—City mains (high, intermediate and low pressures).
5—City services (high and low pressure).
6—Meter setting (high and low pressure).
7—Utilization (industrial and domestic).
8—Meters (orifice, proportional and positive).
9—Meter Shop Repairs.
10—Service or Street Department.
11—New Business Department.
12—Meter Record Depatment.
13—Meter Reading Department.
14—Billing Department.
15—Cashier's Department.
16—Company Garage.
17—Warehouse.
18—Sales Department.
19—Repair Department.
20—Any other department that is not included above.

After these outlines have been taught and studied, the student should be far enough advanced to absorb technical training. This could be taught in the following manner.

Technical Training

Influence each pupil in the class to subscribe to some popular gas journal for home reading. Next select a study course on gas and its technology and teach it to the class. (A good practical course appears in the American Gas Journal each week under "Industrial Gas Lessons." These lessons could be easily secured from the American Gas Journal.) If there were as many as three or four gas companies within a radius of one hundred (100) miles, it would be convenient to have the same teacher teach all four classes. This would be beneficial in that it would enable the teacher to use his illustrations to a lot better advantage. The expense of this teacher along with whatever equipment would be necessary could be prorated between the four companies.

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SKY-RIDING CAME HIGH FIFTY YEARS AGO

The thirteenth day of September, 1856, was a big day for the gas company at Madison, Wis. One of the old record books of the company has the following entry for that date:

"12,000 cu. ft. supplied for ballon ascension."

The simplified spelling is given as it appears in the entry. Reference to newspapers reveals the fact that S. M. Brooks, "the celebrated aeronaut," went up in his mammoth balloon, "The Hercules." Balloon ascensions came high in those days. At that time gas cost $3.50 a thousand cubic feet, and the transportation charges against Mr. Brooks amounted to $42. Today the trip would cost him $11.60.

How Gas Lowers Living Costs

Automatic control will greatly assist in the sale of gas fuel

J. E. Bullard

Every properly made gas sale, especially an industrial sale, lowers living cost. This means that it is not only important to push sales, but to make sales in the right way.

Modern scientific and industrial progress has had upsetting effects upon cherished economic theories. For example, it was long held that high selling prices and low wages meant the highest profits to industry. Yet if we go back for a few hundred years and compare the trend and compare wages and prices at the beginning and at the end of that period this is what we find.

Prices have been trending downward, but wages have been trending upward. The wage earner has been steadily increasing his buying power and also his leisure hours.

We do not have to go very far back to find the twelve-hour working day and low wages for that day. Now we have the eight-hour working day and high wages for the day.

If selling prices are measured in terms of buying power we find that all prices are much lower than they were a hundred years ago. Some prices may have gone up in dollars and cents, but valuing the additional services these prices cover and the wages earned by wage earners, we find that the actual prices are really lower.

Reason for Lower Prices

There has been a very definite reason for this. The theory of high prices and low wages was adopted at the time when little or no mechanical power was used. Back in the days of Rome, when most of the power in industry was man power, back in the days of ancient Egypt, when man power was relied upon almost altogether, the prosperity of the few depended upon the low earning capacity of the many. The power and wealth of a nation rested upon the shoulders of the slaves in that nation.

With man power production is greatly limited. Man unassisted can produce little more than the bare necessities of life. When the power of nature is utilized there is no limit. It has been estimated that in this country it would require the efforts of 250 men per capita to perform the labor now being performed by power.

When man produces more it is necessary for him to take time to consume more. Hence the higher wages, the greater buying power and the lower prices, the shorter hours of work and the more hours for using up what one buys.

Gas plays an important part in this evolution and will play an even more important part in the future. The first great change in industry was in the direction of the utilization of power. It was necessary first of all to find a substitute for man power. This has been found and has been developed to a high degree.

The use of power, however, reaches a limit beyond which it cannot go until other features of manufacture are brought up to the same degree of efficiency. It is only during recent years that really serious attention has been given to the use of heat.

Old-Fashioned Methods Keeping Up Costs

Most of the machinery in the modern plant is developed to a truly marvelous degree. In some cases, however, old-fashioned methods in the use of heat is keeping up costs, preventing the desired uniformity of quality and proving a serious handicap.

Machinery has become largely automatic and before this development can be carried much further heat treating must also be made largely automatic. This requires the use of a fuel that lends itself readily to automatic regulation. Thus far gas is the only fuel that meets all requirements to the greatest degree.

For certain purposes electricity has proved ideal, but it suffers the disadvantages of being an inefficient method of producing heat and having all costs relatively high. Yet it is being used extensively for many purposes in spite of all its handicaps. It is being used because those who sell it have a full realization of the importance of automatic control. If the heat process can be made automatic then the cost of the electricity and the upkeep of the apparatus sinks in significance in comparison with the advantages of having the process made automatic.

Merely changing the fuel used to gas is not selling industrial gas in the truest sense. It is merely substituting gas for something else. It is not selling the automatic idea which is the best selling feature of gas as a fuel.

Why Householder Buys Gas

Practically no householder would heat his house with manufactured gas if he had to keep running down cellar to regulate the burners. He is not buying gas. He is buying automatic heating. He buys gas not because it is gas, but because it lends itself more readily and is more reliable as an automatic fuel than any other that has been used.

Exactly the same is true in industries. As long as gas merely replaces some other fuel it is not sold, it is on trial. The cost of the fuel will be watched and the chances of losing the business are great.

Make the process automatic when gas is applied

and gas is sold. If the degree of heat is automatically regulated, if the parts come into one end of the heat treating furnace and go out of the other end, perfectly treated, then gas is sold. It is not on trial because it is doing something no other fuel can do. The cost of the gas is no longer an important factor. It is now the cost of the process that counts and an automatic process is always less costly than a hand process.

But let us look at what selling gas in this manner means in an economic way. An automatic process means doing the work in exactly the same way all the time. The minimum of attention is required on the part of workers. Fewer parts are spoiled. The work is greatly speeded up and ordinarily considerably less space is required for the process.

Division of Cost Reductions

All these factors serve to reduce the cost. In the long run reductions in cost are divided in three ways. The wage earners get part of it. Those who have invested money in the enterprise get part of it. Those who buy the finished product get part of it.

Selling industrial gas in the right way raises the wages of those working in the industries to which the gas is sold. This raise may not come about immediately after the gas is sold, but it will come about eventually. It increases the return on the capital invested in the enterprise and it means that the man who sold the gas is going to be able some day to buy more than he can buy now. When wages go up in one field they have to go up in others. The better gas men sell industrial gas the more money they are going to earn eventually and the more the money they earn is going to buy.

The faster and the better the gas is sold the sooner the change takes place. But the gas must be really sold. Unless the process is greatly improved as a result of the application of the gas, then no great improvement has been made. Perhaps no improvement has been made at all.

It is the process that requires studying and not the fuel that is being used. No matter whether oil, coal, coke or electricity is being used, the application of gas should at once make the process more automatic than it has been before.

Problem Is to Make Process Automatic

The real problem is to make heat treating a purely automatic process. The effort should be directed toward doing away with all human effort and the need of special skill. One phase of research that is sadly needed in the gas field is research along the line of automatic heat treating with gas.

Already there are far too many applications of gas where the advantage is none too apparent and where the buyer of gas is not yet fully convinced that he is using the best fuel. Not until the process is made just as automatic as it possibly can be is the gas man secure. So long as he leaves room for improvement the seller of some other fuel may come along with those improvements and a different source of heat is sold.

This is an automatic age. We not only manufacture products on automatic machines, but we have automatic machines making automatic machines to make something else. The weak point in the chain is the perfecting of automatic heat treating. This is being done in some cases, but is not yet sufficiently universal.

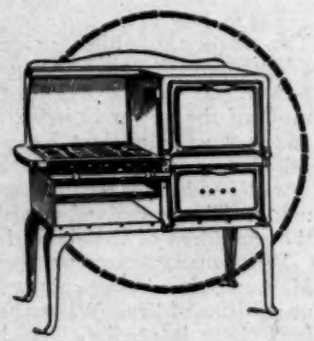
In the long run it is better to delay the sale of gas for a certain process for a year or more if during that delay a means of making the process automatic by the application of gas can be found. It is the automatic feature that counts most, that reduces cost to the greatest degree, that raises wages and lowers prices.

Ideal Method

The ideal method of heat treating is where the parts to be treated go directly from the last machining process into the treating furnace, pass through it automatically and come out with the heat treatment perfectly accomplished. In most cases this requires careful designing, careful installation, perhaps some special research work and experimenting. But when gas is sold in this way it is really sold. Each such installation makes the next one easier and hastens the day when all heat treating will become automatic and will be accomplished by gas.

Any great degree of carelessness in regard to making the process automatic leaves the way open to competitors. Gas is by no means the only fuel. The increasing cost of oil is going to lead to more work in the direction of its automatic use. The electrical man is already alive to the importance of the automatic. Yet the gas man can accomplish more than either of these other two. He has a low priced and perfect fuel. All that is necessary to make it show the best possible results is to make brains with it.

THE *Best* GAS RANGE Which is it ?



AMONG so many that will give perfect service, it is impossible to pick out one "best" Gas Range for your use.

However, be warned! There is a difference among ranges—in some cases a vital difference.

For the protection of yourself and your tenants, install only those appliances which have been tested and approved in our own laboratory as well as in the national Testing Laboratory of the American Gas Association.

Consolidated Gas Co. of N.Y. — New Amsterdam Gas Company — Northern Union Gas Company — New York & Queens Gas Company

East River Gas Company

Consolidated Gas Company of New York

WM. B. COSTELLO, President

1823 — MORE THAN 100 YEARS OF UNINTERRUPTED PUBLIC SERVICE — 1927

As The Journal Views It

THE GAS INDUSTRY TAKES A GIANT STRIDE

Most of us are so fed up on happenings and events of an outre and out-of-the-ordinary nature that nothing short of the sensational stimulates our interest and accelerates the pulse beat. The proposed affiliation between the Natural Gas Association of America and the American Gas Association can, we believe, be well included in the latter category. Its consummation will be altogether epoch-making—a giant stride, in a sense, toward everything that will be of a benefit to the two associations, as well as industry and gas consumers in general. Further, it will mark a distinct and important contribution to our national program of conservation.

In the case of manufactured gas, man has labored mightily from the days of Murdoch in placing the art of converting coal into a clean and economical fuel on its present well-ordered and efficient plane. More, he has accomplished something worth while in developing a really scientific but none the less practical commercial vehicle for serving the industry's customers.

On the other hand, Natural Gas has been prepared in the workshop of Mother Earth in a state almost entirely ready for utilization. Hence the natural gas man's worries anent the problems of production have been almost nil when compared to those that have at times beset the artificial gas industry. But natural gas has also had its tangles and snarls of distribution and marketing to contend with, and in this wise the two closely associated industries have been doing a quite similar work. In this regard gas men of both branches have for years desired that some such step as the contemplated one be taken.

Obviously, much duplication along the lines of research as to utilization in the proper appliances, as well as the most desirable methods of distributing and selling the product, will be eliminated. In addition, matters of boosting any waning natural gas supply by means of admixtures of manufactured gas will be greatly facilitated by the proposed amalgamation of the two associations' activities.

It would be well to bear in mind that the natural gas industry by no means associates its activities with those of the artificial gas industry from a sense of seeking for some sort of industrial life preserver; far from it. Any industry that puts out a product that reaches some thirteen million people and serves eighteen thousand industrial customers in an efficient manner is one that is well worth teaming up with. When we speak of an industry that supplies one quadrillion heat units annually—enough to supply a plenteous bath of hot water to our entire population every day in the year, with some to spare—such a business is nothing less than tremendous in its size and scope.

The gas industry is on the eve of great developments that will be reflected in many benefits to our country, assuming that this close association of the two industries receives official sanction. The American Gas Journal subscribes whole heartedly to the movement.

CORROSION

From the time that man first learned to wrest the various metals from their ores there has been waged a constant and relentless industrial strife with the elements to prevent a reversion to their original condition. Into the maw of flaming furnace and seething fire-pot have we heaved metallic ores to the end that the gross metal obtained therefrom might be laboriously wrought into form and shape suitable to the needs of industry and the general advancement of humanity. And then nature voraciously attacks our finished product with her whole retinue of destructive elements—and generally wins.

Annually we spend millions in order to retard such destructive work, which we group under the general heading of corrosion. And at best all that we can hope to do is to delay the evil day when the metal part or object must be discarded and replaced with a new one.

Our problem is to combat the process of corrosion by studying its modus operandi and subsequently devising methods and substances to check the rate of its action. Hence those most interested in the matter should not spinelessly assume that corrosion is going to happen nolens volens and act accordingly. Theirs should be an untiring effort to ascertain the best corrosion remedies extant and practice them.

INDUSTRIAL GAS LESSONS

IF IT'S DONE WITH HEAT — YOU CAN DO IT BETTER WITH GAS

Lesson No. 170

Blue Water Gas

Auxiliary Apparatus in the Plant

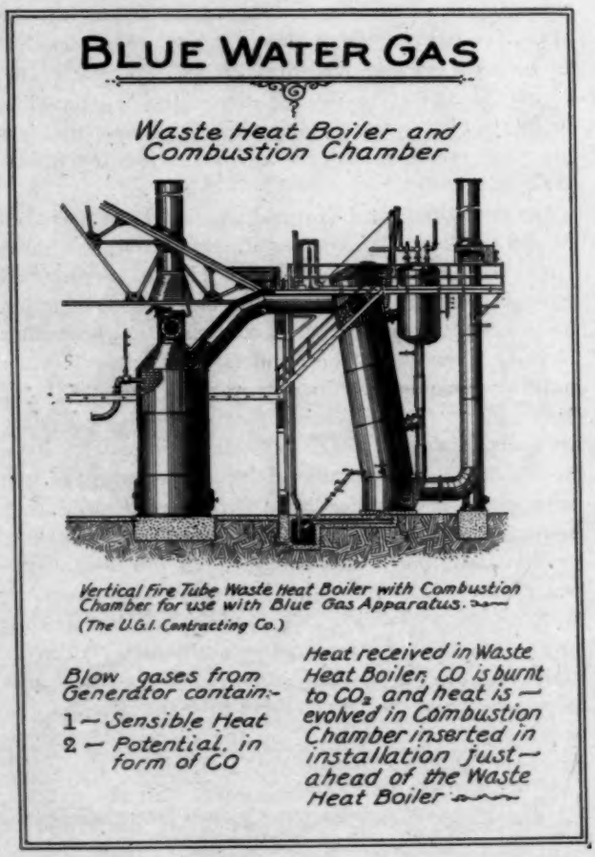
We have discussed the generator, which is, of course, the principal apparatus in the blue water gas plant. But it is by no means the only unit of apparatus that is necessary for the manufacture of water gas. There are other important auxiliary apparatus, each of which has an important role to play in the water gas process. These are the waste heat boiler, the igniter or combustion chamber, the air and steam gages, the charry apparatus and the blower.

We shall consider first the waste heat boiler and to understand the importance of this piece of apparatus it is first necessary to appreciate the great amount of heat that goes to loss in the blow gases. The heat balance of the water gas set shows that from fifty to sixty per cent of the heat input, figuring both the heat in the coke as well as in the steam, is delivered by the machine in the form of water gas. It has also been found that of all the losses the most important is that entailed by the hot blow gases, more than one-quarter of the heat input being lost in that fashion. It has been variously figured that the blow gases contain 18.95 and 22.59 per cent of potential heat and 9.33 and 5.30 per cent of sensible heat.

The need of recovering this heat in some suitable manner is therefore evident, if the process is to show a proper thermal efficiency. The method used of recovering some of this waste heat is by using a waste heat boiler, one installation of which is shown in the accompanying illustration.

Combustion Chamber

The blow gases have been said to contain potential heat, and this naturally infers that they contain some combustible gas, which is carbon monoxide. In order to be able to take advantage of the potential heat of this gas, it is necessar·· to burn it, and this is done in the igniter or combustion chamber, which has also been mentioned as one of the auxiliary apparatus in the blue gas plant. This chamber is located just ahead of the boiler and is seen to the left of the figure. The chamber is provided with a stack. The chamber is also fitted with an air blast connection. This is for the purpose of leading secondary air into the chamber for burning carbon monoxide content of the blow gases that are obtained by blasting the generator. Thus the heat of combustion in the blow gases is recovered as well as the sensible heat. The combustion chamber does serve the double purpose of bringing about combustion of the combustible ingredient in the blow gases and mixing the hot products of combustion in a thorough manner before they are introduced into the waste heat boiler proper. The combustion chamber is fitted with checker brick for the purpose of securing more intimate admixture of the hot gases and insuring complete combustion of the carbon monoxide. Means are always provided in the combus-


BLUE WATER GAS
Waste Heat Boiler and Combustion Chamber
Blow gases from Generator contain:-
1 — Sensible Heat
2 — Potential, in form of CO
Heat received in Waste Heat Boiler, CO is burnt to CO_2 and heat is evolved in Combustion Chamber inserted in installation just ahead of the Waste Heat Boiler

Vertical Fire Tube Waste Heat Boiler with Combustion Chamber for use with Blue Gas Apparatus. (The U.G.I. Contracting Co.)

tion chamber for removing the dust which separates out of the gas due to the change in the direction of its flow and its reduction in speed.

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TAKING THE GAMBLE OUT OF BUSINESS*

Co-Operative Market Research Decreases Industry's Unknown Factors and Points Way to Industrial Prosperity

Charles F. Abbott,

Executive Director, American Institute of Steel Construction, Inc.

(Continued from May 14th Issue)

Success of Industry as a Whole Determines Prosperity of Individual Organization

IT is obvious that the prosperity of any individual organization is, in the final analysis, based upon the success of the industry as a whole. Research conducted by an individual organization helps that particular unit, but something more is needed when industry is marshaled against industry for what it considers its legitimate share of the consumer's dollar.

Let us examine in more detail the competitive condition that exists at the present time. We have come to think of steel as the very basis of our civilization. We speak of our age as "The Age of Steel." Steel is one of the fundamental factors of our economic life.

The steel industry grows like Topsy. It was not nursed and fostered. No one worried about its future. The majority of the leaders of the industry took the position that people had to have steel, and that when they wanted it they could ask for it. There were, and are, exceptions to that attitude, but it is still prevalent throughout the industry.

What has been the result? Here is one consequence that has inevitably followed such a policy. The structural steel industry, the branch of the steel industry that fabricates the steel for structural purposes, is selling each year 4,000,000 tons less than it should, due to encroachments of substitute materials.

There you have the new competition between industries. The same type of competition exists between slate, wood, asbestos, copper, zinc and sheet steel for roofing, between oil and coal for heating; between electricity and gas for fuel, and between a hundred other commodities, each one of which may be used in place of another.

No Organization Big Enough to Develop a New Market

What can one concern do, or individual research accomplish, in the face of competition from an entire industry? There is no organization in the United States big enough to adequately develop a new market. There is no one concern big enough to assure the proper use of its product throughout the country.

There are thousands of concerns that are not large enough to carry on any effective market research, that are not powerful enough to even begin to develop a new market, and that cannot in any way assure the use of their product to the limit of its potentialities.

What is the answer? Must all that I have said about the future of commercial research remain in the realm of theory just because the problem is too big for any one organization to solve?

Not at all. Industrial co-operation provides an adequate means to meet the situation as it exists. To large concern and small co-operation offers a method by which commercial research can be utilized to the full extent of its tremendous possibilities.

Experience of Structural Steel Industry

To make my point clear, let me cite the experience of the structural steel industry. As I have already said, this industry is losing a large amount of business each year to competitive interests. Yet within the last few years the situation has been greatly improved.

The co-operative association of the structural steel fabricators, the American Institute of Steel Construction, was organized in 1921 to promote the use of structural steel through research, standardization, and the adoption of uniform practices.

At the time of the Institute's organization there was no generally accepted standard governing the design, fabrication, or erection of structural steel. Individual architects and engineers had their own standards, scarcely any two of which were alike. Varying trade customs were the cause of continuous misunderstandings between buyer and seller.

Municipal building codes differed greatly throughout the country. Many of them imposed unjustifiable restrictions on steel, placing it in an unfavorable position as regards competitive materials. The users of structural steel were not permitted to get out of it all the work it was capable of doing.

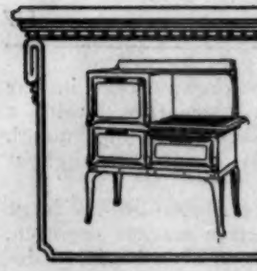
A survey made it clear that the immediate necessity was for standard practices to take the place of the diverse and largely rule-of-thumb methods prevalent at the time. As the first step in this direction, a committee selected from the leaders in the engineering, architectural and academic professions was called upon to prepare a standard specification for the design, fabrication and erection of structural steel.

Safety the Goal

Safety, combined with economy for fabricator and user, was the goal in view. At the same time it was clearly recognized that any move that would en-

(Continued on page 18)

*An address delivered before the American Institute of the City of New York May 5, 1927.



GAS MERCHANDISING

Domestic – Industrial

Ideas for the Man Who Sells

William H. Matlack

WHITE SPACE WINS IN ADVERTISING

Whenever a group of advertising men get together some one of them is sure to ask: "What is it about the advertising that comes from the coast that makes it so different?" "What is it that makes it stand out and win your attention?" "Is it the illustrations, that free and easy style of hand lettering that seems to creep into all California advertisements—or just what is it?"

There is no doubt that the advertisements that come from "the coast" win the attention of the newspaper reader, the magazine reader or any reader who may see them. There is no doubt that the "California atmosphere" is nicely, artistically, if you will, woven into the illustrations. There is no doubt about the nicety of lay-out—but the thing that wins attention according to our view is the white space. California advertisers are generous users of white space. One would judge that the lay-out man, getting a schedule of sizes to produce, goes about laying out the advertisements to fit spaces first of all, and then gives consideration to how and where he is to provide white space around the text matter and illustrations. The P. G. and E. "Pacific Service" advertisements reproduced for your file this week provide an excellent illustration of the judicious employment of white space by a gas man.

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FLYING SQUADRONS

There seems to be some resistance these days to the flying squadron method of selling. One sales manager that we know loses his good disposition every time any one suggests that a special crew be employed to drive over a certain unit. "These second story men," he says, "do, somehow, get a lot of orders—but, oh brother, how many were not completely sold! I can illustrate that better in our store-room. No, we prefer to go along with our own regular men and in the end of twenty-four months show a good clean lot of sales that stay sold!"

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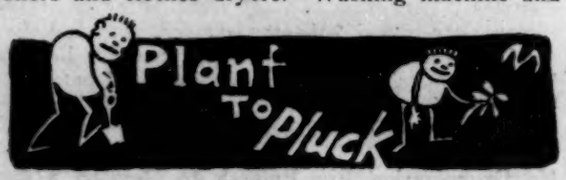
PLANT TO PLUCK

If you are expecting to build up the home laundry field, you will have to plant a lot of ideas in the mind of the home manager before you may reasonably expect to pluck any worth-while rewards in the way of orders for laundry stoves, gas heated washer, ironers and clothes dryers. Washing machine and



ironing machine manufacturers have spent a lot of time and money in spreading the idea of home laundered clothes—but it remains for the gas man to finish the job—to come in after the clothes have been washed and before they are ironed—and furnish a sanitary and satisfactory way to dry them. There are several good dryers on the market today,

and those who are interested in adding from 250 to 500 cubic feet per week to the average domestic meter should get lined up with some one of them. The home laundry has come to stay—it's up to gas men to make it complete.

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LEVELING A 1,000,000 CUBIC FOOT FOUR LIFT GAS HOLDER*

Low Side Lifted Above Horizontal in Order to Delay Future Releveling

Neil G. Medbery,
Stone & Webster, Inc.

THE leveling of a gas holder is not so unusual a project today as it was twelve years ago, when the Connecticut Power Company was faced with the necessity of lifting its 200,000 cubic foot storage holder which had settled about nine inches. Since then the 5,000,000 cubic foot holder of the Lynn Gas & Electric Company has been successfully releveled twice.

However, as each particular holder brings its own peculiar problems, there may be found in the leveling of the 1,000,000 cubic foot holder of the Connecticut Power Company some items of interest to anyone faced with a similar problem. This holder was built during the spring and summer of 1924 and rested on a reinforced concrete mat supported on wood piles at an elevation about five feet lower than the general surrounding ground. A twelve-inch concrete retaining wall was built on the circumference of the mat about three feet distant from the periphery of the tank. The foundation consisted of nine hundred and ninety-seven piles spaced about three feet four inches on centers and varying in length from twenty-five to forty feet, all of which were driven to carrying capacity in excess of twelve tons based on the Engineering-News formula, and one of which was load tested to fifteen and one-half tons for fifteen hours without settlement.

Caisson Foundation Deemed Too Expensive

This design of foundation was selected in preference to a pile or caisson type to bed rock which would have cost about three times as much. As there seemed to be slight chance of settlement, the additional expenditure did not appear justified.

The holder itself is of the four lift type, having a water tank one hundred and ten feet six inches in diameter by thirty-one feet in height, and the total weight of the holder and tank, not including the weight of the water, is six hundred and eighty-six tons. The water increased the weight by ninety-two hundred tons, giving a loading on the foundation of approximately ten tons per pile, which is materially less than the bearing value of these piles. Nevertheless, the total superimposed load proved too much for the underlying stratum of clay, which contains a high percentage of voids and organic matter, with the result that there has been a settlement of approximately six and three-quarters inches on the east or river side, with practically no motion either up or down on the side farthest from the river.

Initial Settlement

An initial settlement of one and three-quarters inches was noticed and probably occurred when the tank was being filled, and at a time when the water level was about two feet from the top. The settlement since then has been fairly uniform, but has shown a tendency to decrease in the past year, and it is hoped that it may eventually stop altogether.

Level readings have been taken monthly during the last two years at four points on the holder, and, as the north and south points have settled about one-half as much as the east point, and as no apparent fracture of any kind to the foundation or retaining wall can be seen, it is reasonable to assume that the settlement has been on an even plane and that no damage has been done to the concrete foundation or to the tank.

When the settlement had reached three and one-half inches it seemed advisable to plumb the guide frame and this was done by inserting shims at the base of the columns. It is believed that this settlement is due to the gradual consolidation of the wedge shaped layer of clay, the top of which is about forty feet below the surface.

Low Side Lifted Six Inches

While the rate of settlement is decreasing, it is impossible to predict when this clay will become sufficiently compact to bear the weight of the holder and the superimposed layer of earth. It is quite possible that this state of equilibrium may not be reached for several years and that a settlement of about one inch per year may be expected for the next six or seven years. Therefore, it seemed desirable to lift the low side of the holder six inches above the horizontal in order to postpone the date at which it may be necessary to again level the holder. One-half of the resulting tilting of the guide frame will be removed by reversing the shims which had previously been installed.

Although it was not considered that the settlement had reached a point where it was dangerous to operate the holder, it seemed advisable to the Connecticut Power Company to do the work of releveling this spring before the increasing sendout should make it difficult to operate the plant without the use of this holder.

In considering methods to be used in the releveling the one used by Bartlett-Hayward Company at Lynn of driving long wedges at frequent intervals around the periphery of the tank recommended itself on the basis of cost and simplicity, as no elaborate equipment would be required. This method, however, in connection with the New London holder,

*Paper presented at meeting of Operating Division of the New England Gas Association, New London, Conn., May 6-7, 1927.

would have necessitated the removal of the concrete retaining wall and a large amount of earth in order to secure room for driving the wedges, and was therefore discarded in favor of the use of jacks.

Outline of Work

In general the work consisted of the following operations:

1. Purging, draining and cleaning.
2. Installation of jacks.
3. Lifting.
4. Securing it in its new position.
5. Reconditioning and replacing in service.

The holder was taken out of service on April 5 with a small amount of gas left under the crown to permit the removal of manhole covers under pressure. Two manholes were removed and the openings covered with wire gauze and the inner lift landed. Fortunately, contrary to our expectations, hardly a trace of oil was found on the surface of the water. This condition, which indicated very efficient operation of the plant, saved considerable time in the releveling process, as it would have been necessary to remove all oil before discharging the tank water into the harbor. A steam jet was at once placed in the manhole nearest the curb to purge the crown and a six-inch syphon discharging into the tank pit was started to drain the tank.

In removing the water from the tank, it was found that a six-inch drain from the pit around the tank would not handle the amount of water delivered by the six-inch syphon, so a centrifugal pump was installed to supplement the drain. An additional four-inch syphon was installed to reduce the time of unwatering the tank. The six-inch syphon broke with the water level twelve inches from the bottom, and the remaining water was removed with a two-inch steam syphon and by cutting ten rivets from the bottom curb angle. In all, five days were required to completely drain the tank.

Manholes Opened to Ventilate Lifts

As soon as the water was out, additional manholes on the crown were opened to ventilate the lifts, and on April 11 we were able to enter to clean up the bottom.

In the jacking process thirty-six (36) 25-ton Norton ratchet foot jacks were used to lift the tank, guide frame and holder lifts. Twenty-three 10-ton screw jacks were used for lifting the crown support and the crown, and twelve standard lowering screws were used to assist in lifting the tank bottom. Seven-inch I-beams were installed adjacent to each of eighteen (18) of the permanent landing beams where the greatest settlement had occurred. The outer end of these seven-inch beams rested on the outer curb angle and the inner end extended clear of the inner lift. Holes were burned in the tank bottom to allow the placing of one foot jack under the inner end of each of these beams and the concrete foundation was cut to permit the use of a similar jack under the tank shell at a point directly below the outer end of these beams.

Six days were required to complete the preparations and on April 18th, when all the seventy-one jacks were in place, the lifting of the holder was started. Extreme care was used to distribute the load evenly on the jacks, so that no undue strain should come on any one part of the structure. The jacking process was followed up closely with shims and wedges, so that the failure of any jack would not cause a sudden settlement of any part of the structure.

Two Outlets on High Side

Of the three inlet and outlet connections to the gas holder through the bottom, two were located on the high side and as the lift at these points was small, it was not necessary to disturb them, as the tank bottom could safely be allowed to dish down at these points. The third connection was located at a point where the holder was to be lifted about five inches, so the bottom plates were burned free from the flange, raised the required amount, and welded to a new flange which was welded to the riser at the correct height. The space adjacent to the riser was grouted full before the flange was welded to the pipe.

When the jacking process, which required three days, had been completed, permanent steel shims were placed under each end of the landing beams and under the crown support posts. The jacks were then removed and the space between the tank bottom and the foundation filled with a mixture of fine sand and crushed stone dust to a line eighteen inches from the circumference. This material was blown into place with compressed air and tamped where it could be reached. As much of this material as possible was placed from the outside of the tank, but it was necessary to fill up the center portion through the holes which had been cut in the bottom of the jacks. This process, while not difficult, was necessarily a slow one, requiring twelve days for completion.

The outer ring extending eighteen inches under the tank was filled with concrete, where the opening would permit, and the remainder grouted. After plates had been welded over the holes in the tank bottom and all rivets which had been removed had been replaced, any areas under the tank which had not been completely filled with sand were grouted. The calking was inspected and touched up where necessary, the tank thoroughly cleaned and made ready for refilling.

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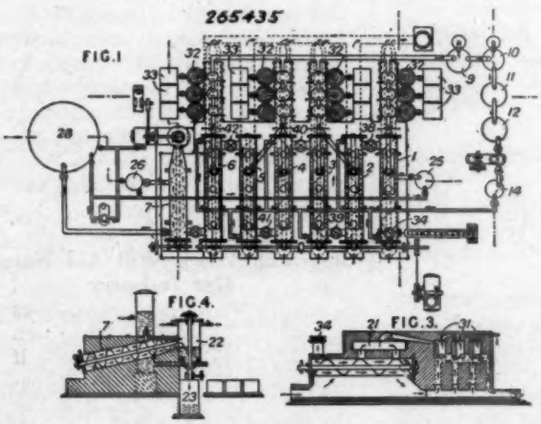
GAS ONCE MADE BY SLAVES

Sixty-seven years ago negro slaves made up the gas house gang of the New Orleans Gas Company. Books of the company for 1860, recently brought to light, show the negroes listed as "live assets" and valued at $53,000. A fifteen-foot brick wall with iron-barred gates was a necessary part of the plant in order to keep the slaves from running away.

PROGRESS IN GAS TECHNOLOGY
Domestic and Foreign

LOW TEMPERATURE DISTILLATION OF SOLID FUELS

SOLID fuel is ground and mixed with a liquid of higher boiling point than that of the products to be obtained, the liquid acting as a vehicle for conveying the fuel through a series of retorts which are heated by increasing temperatures. The ground fuel is charged through a valve, 34, into the first of six retorts, 1—6 which contain heavy oil, a screw



conveyor being provided to pass the mixture from one retort to the next through valves 38—42. Each retort is maintained by a fixed temperature, which reaches 400 degrees C. in the sixth, from which the mixture passes into an inclined vessel, 7, which discharges the mass into a rotary separator, 22, from which the semi-coke is emptied into a receptacle, 23, and the liquid pumped into a tank, 28, from which the tanks, 25 and 26, supplying the retorts, 1—6, and the vessel, 7, are fed. The volatiles from each retort pass through collecting chambers, 21, to dephlegmators, 31, to condense the products of fractional distillation, and these products from condensers, 32, are collected in receptacles, 33. The permanent gases are passed through washers, 9—12, to a receiver, 14, from which a part is withdrawn to heat the retorts or agitate the mixture in them. British Patent No. 265,435.

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CYANOGEN IN GAS AND ITS REMOVAL

THE article, which is published in Das Gas und Wasserfach, 1927, volume 70, pages 165 to 171, is concerned with a discussion of cyanogen in gas and the economics of the wet cyanogen purification process with regard to the present-day higher demands of purity of gas for household and industrial uses. Methods of diminishing corrosion by a more complete removal of the active impurities in coal gas present fewer practical difficulties than the method of drying the gas. A full analysis is made of the economics of cyanogen removal by Buen's process, which is based on the practice of the Stuttgart works. The gas contains 0.5 per cent of sulphuretted hydrogen and 115 grams per cubic meter of hydrogen cyanide, twenty-one per cent of the latter remaining in the gas after iron oxide purification and ammonia scrubbing.

The cost of oxide purification, without the previous removal of cyanogen, is estimated. Complete cyanogen removal results in a twenty-one per cent lowering of the cost of the subsequent oxide purification, due to increased efficiency of the latter, no oxide being utilized for the formation of Prussian blue and to the removal of part of the sulphur in the cyanogen washer. In addition to this the cyanogen recovery itself results in a new gain. These gains, however, are small compared with the indirect pipes, holders, etc.

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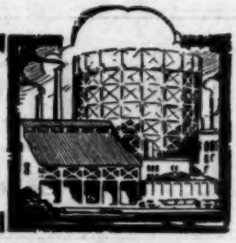
REMOVING TAR FROM PRODUCER GAS AND COKE OVEN GAS

THE construction and principles underlying the operation of a Lurgi electrostatic precipitation plant are described briefly, and the results of a number of tests on the removal of tar and oil from producer and coke oven gas by the apparatus are recorded. The gas passes directly from the producers to two precipitation chambers in series, then through three cooling towers, and finally through two more precipitation chambers. The temperature in the first two chambers is maintained at a temperature of 80 to 90 degrees C. to prevent precipitation of moisture in the tar deposited. Almost complete removal of the tar is effected here, and the product contains less than one per cent of moisture. In the cooling towers most of the water vapor is condensed and a layer of mobile oil is obtained free from tarry matter, while the second series of chambers removes the last traces of mist and recovers a advantages due to elimination of corrosion in the small quantity of light oil. The purified gases contain usually much less than 0.02 gram per cubic meter of suspended matter. The power consumption of the plant is less than one-quarter of the usual centrifugal washing apparatus.

Stahl und Eisen, volume 46, pages 1863 to 1870.

NEWS OF THE GAS INDUSTRY



Natural Gas Association Unanimously Votes to Amalgamate With the American Gas Association

On May 10 the Natural Gas Association of America at its 22nd annual meeting at Cincinnati, O., unanimously voted to amalgamate with the American Gas Association. The text of the resolution passed is as follows:

"Resolved, That the report of the Committee on Affiliation of the Natural Gas Association and the American Gas Association be approved and presented by the chairman of the committee to the association at this convention, with the following resolution:

"Be it resolved, by the Natural Gas Association of America in convention assembled:

"1. That the report of the Committee on Affiliation be and the same is hereby adopted and ratified.

"2. That the incoming officers and the Board of Directors elected at this association meeting, be directed to complete the amalgamation of the two associations under the general provisions as set forth in the recommendations of said committee, and to surrender the charter of the Natural Gas Association of America.

"3. Any surplus funds that may be on hand after completing the closing out of the Natural Gas Association be used for such purposes as the newly created Natural Gas Department may authorize."

Committee on Affiliation

The Natural Gas Association Committee on the Desirability of the Affiliation consisted of the following:

H. C. Cooper, Raymond Cross, R. W. Gallagher and A. W. Robertson. This committee had agreed upon a tentative basis of amalgamation with the A. G. A. committee, the members of which were: Harry C. Abell, George N. Whitwell and Clare N. Stannard.

Both of these committees decided that the correlation of the activities of all branches of the manufactured and natural gas associations would be for the common good of the industries at large.

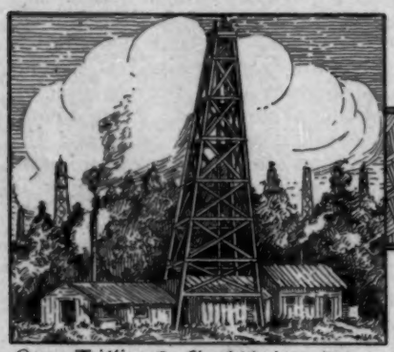
Activities such as the $500,000.00 research fund of the American Gas Association to develop efficient appliances for the utilization of gas in industry would be impractical to duplicate because of the large amount of money involved, and because an affiliation of the two associations would allow both industries to participate in the benefits resulting from this research work.

The work of the Testing Laboratory was considered in the same light. The Natural Gas Association has contributed $5,000 for the support of the laboratory program.

The work of the Commercial and Accounting sections of the American Gas Association is such that the members of the Natural Gas Association would be able to enjoy. The active accounting work undertaken and the comprehensive and constructive nation-wide program for the stimulation of gas sales can well be applied to cover the natural gas territories as well as the manufactured.

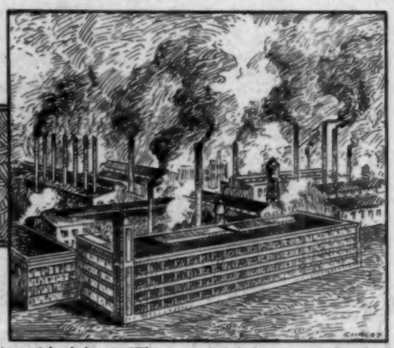
Research Work Will Aid Natural Gas Industry

Of special interest to the Natural Gas Association is the work started by the Technical Section of the A. G. A. to conduct research in the mixing of gases of various kinds, and a study of the adaptability of these gases in both industrial and domestic appliances. The natural gas industry will find this work of inestimable value if it some time becomes necessary to augment the present supply of natural gas with the manufactured product.



One Trillion Cu.ft of Natural Gas — was produced in 1923. Of this amount—

Three and one-quarter Million Domestic Customers used 278 Billion Cu.ft.



Eighteen Thousand Industrial Customers consumed 730 Billion Cu.ft.

The study of rate structures and gas distribution problems are also similar in nature to the above. The Natural Gas Association has been spending between $30,000 and $40,000 a year for these activities, whereas the American Gas Association has been using appropriations upward of $500,000 a year. Investigation has shown that practically all the problems in the natural gas industry are similar to those of the manufactured gas industry, with the possible exception of matters pertaining to the production of gas.

Present indications point to a unanimous ratification of the amalgamation of the two associations by the Executive Board of the American Gas Association at the next meeting, at Atlantic City, N. J., June 3 and 4.

Natural Gas Association Organized in 1906

The Natural Gas Association was organized in Pittsburgh in 1906, and has held annual conventions since that time. The organization's proceedings for 1925 give the membership as 100 company members and 1,800 individual members, all classes. Among some of the larger company members are: Equitable Gas Company, Hope Natural Gas Company, Manufacturers' Light & Heat Company, Ohio Fuel Company and Peoples Natural Gas Company, all of Pittsburgh; United Fuel Gas Company and Columbia Gas & Electric Company, of Charleston, W. Va.; the East Ohio Gas Company, Cleveland; Logan Gas Company, Columbia, O.; Lone Star Gas Company, Dallas, Texas; Oklahoma Natural Gas Corporation, Tulsa, Okla., and the United Natural Gas Company, Oil City, Pa.

According to statistics made public by the Geological Survey for 1923, the latest available at A. G. A. headquarters, the natural gas industry for that year produced in round figures one trillion cubic feet of gas. Three and one-quarter million domestic customers consumed 278,000,000,000 cubic feet at an average price of 51.1 cents per thousand, and 730,000,000,000 cubic feet were consumed by about 18,000 industrial customers, including all users, at an average price of 13.4 cents per thousand.

Convention Calendar

May

25-28—New York Regional Sales Conference. Annual meeting, Lake Mohonk Mountain House, Lake Mohonk, New York.

31 & June 1—American Gas Association. Production Conference of Technical Section, Detroit, Mich.

June

16-17—Canadian Gas Association. Annual convention, King Edward Hotel, Toronto, Canada. G. W. Allen, secretary-treasurer, Toronto.

21-22—Empire State Gas and Electric Association. Annual meeting, Commercial Section, Elmira, N. Y.

July

5-7—Michigan Gas Association. Annual convention, Grand Hotel, Mackinac Island, Mich. Albert G. Schroeder, secretary-treasurer, Grand Rapids, Mich.

* * *

Becker Type Ovens to Supply Gas to Montreal

The Montreal Coke and Manufacturing Company will install a Becker type coke and gas plant to supply gas to the Montreal Light, Heat & Power Company, Consolidated, for distribution in Montreal.

A contract has been awarded to the By-Product Coke Company of Canada, Limited, Canadian subsidiary of the Koppers Company, for the design and erection of the plant. The installation will consist of 59 Becker type ovens and four Koppers gas producers, complete equipment for by-product recovery and a Koppers coke handling plant-naphthalene removal apparatus will be included, and alterations will be made to adapt the existing liquid purification equipment to the use of the sulphur recovery process.

The plant will be a complete production unit and will be characterized by ready and exact adjustment of outfit to demand.

Percy H. Whiting Leaves Doherty Organization—Will Form Own Company

Percy H. Whiting, who for nearly ten years has been active in customer ownership work for various electric and gas companies, has left Henry L. Doherty & Co., where he was first manager of the customer ownership division and later general retail sales manager, to form his own organization, P. H. Whiting & Co., Inc., with a main office at 1 Wall Street, New York, and a branch office in Newark.

Mr. Whiting has been a member of the Customer Ownership Committee of the National Electric Light Association since its organization, and has been a frequent speaker and writer on customer ownership subjects.

Associated with Mr. Whiting in the new company will be R. C. Harvey, who for three years was manager of employee campaigns for the Doherty organization and who was previously manager of the securities department of Adirondack Power and Light Corporation; A. S. Brown, formerly sales manager of the securities department of Central Maine Power Company, Augusta, Me., and now occupying the same position for International Utilities; T. E. Falvey, formerly manager of sales for the customer ownership division of Henry L. Doherty & Co.; A. B. Collins, formerly manager of the customer ownership department of Empire Gas and Fuel Company of Bartlesville, Okla., and C. D. Beckman, formerly sales promotion manager of Henry L. Doherty & Co.

The new company will conduct a general securities business and in addition will handle customer ownership selling for several utilities, and will specialize on conducting employee campaigns.

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New Member of Public Utilities

Denver.—Worth Allen of Greeley was appointed a member of the Colorado Public Utilities Commission by Governor Adams. The senate confirmed the appointment.

Second Short Course in Industrial Gas Engineering of Illinois Gas Assn. to Be Unique---to Be Held at University of Illinois

The Illinois Gas Association announces the second short course in industrial gas engineering, to be held at the University of Illinois, beginning June 20, 1927.

The Illinois Gas Association will this year present the most unique course in the marketing of gas in wholesale quantities ever offered anywhere in the United States.

A questionnaire was sent out by the association to the principal gas companies in the Middle West, asking them, quite specifically, just what they would like to have taught in a two-weeks course.

Thirty-five of the larger companies immediately replied with specific suggestions and on the basis of these suggestions a course has been outlined of an entirely different nature than anything yet presented.

The course will be devoted chiefly to gas-fired house heating, and instead of featuring the engineering facts involved, the curriculum indicates that the salesmanship of house heating will predominate the course. Nevertheless, industrial, hotel and restaurant work will be given due consideration.

Among the faculty already engaged to instruct are the following nationally known authorities:

Professor W. Trinks, Professor of Mechanical Engineering, Carnegie University.

Professor E. E. Ferris, Professor of Salesmanship, New York University.

Professor F. A. Russell, Professor of Organization and Operation, University of Illinois.

Professor Vincent S. Day, Professor of Special Research, University of Illinois.

Mr. Kirke Taylor, President National Association of Purchasing Agents.

Mr. William A. Darrah, President Continental Industrial Engineering Company.

Mr. Harold B. Johns, House Heating Engineer, Peoples Gas, Light and Coke Company.

Interesting Symposiums

In addition to the lectures, recitations and demonstrations to be held, two symposiums of extraordinary interest are scheduled. The first will be held by the manufacturers' representatives of the principal makers of gas-fired house heating equipment. The second symposium will be devoted to general descriptions regarding various makes and types of insulating material.

The course will be two weeks in length and so arranged that those who have taken similar courses will be installed in advanced classes, while "beginners" will be afforded an opportunity to secure a good "grounding" in the art of marketing in wholesale quantities.

The tuition is $20, and no reduction will be made to those desiring to take less than the full two weeks' course. Upon successful completion of the work the Illinois Gas Association will issue official certificates, as well as cash awards to the two students having highest grades in the final examination.

For further information, address all communications to Mr. A. B. Greenleaf, Room 325, Peoples Gas Building, Chicago.

The course will be under the direction of the Illinois Gas Association Committee to Co-operate with Educational Institutions.

The personnel of the committee is as follows:

Mr. E. K. Demlow, Illinois Power and Light Corporation.

Mr. J. D. Preble, Public Service Company, of Northern Illinois.

Mr. R. E. Chew, Union Gas and Electric Company.

Mr. E. E. Lungreen, Western United Gas and Electric Co.

Mr. A. B. Greenleaf, Chairman, The Peoples Gas, Light and Coke Company.

Western Gas Construction Company Awarded Contract to Lay Fifteen Miles of Mains

The Public Service Company of Northern Illinois has contracted with the Western Gas Construction Company of Fort Wayne, Ind., for the laying of a four-inch pipe line from Argo to Justice Park, Illinois.

Work is to begin immediately and to be done in conjunction with the laying of the line from Tinley Park to Mokena and Frankfort. The contract for this latter line was let to the Western Gas Construction Company some time ago and work on it is progressing very favorably.

The total length of the two extensions amounts to approximately fifteen miles.

The Western Gas Construction Company has received orders from the Detroit City Gas Company, Detroit, Mich., for a lot of 20-inch, 24-inch, 30-inch and 42-inch gate valves, which are for installation at the Detroit City Gas Company's plants at their Coolidge and Lynch stations.

FIRST NATURAL GAS STORAGE TANK IN COUNTY ARRIVES

First Natural Gas Storage Plant In County At Shuckman Ranch

Williams, Cal.—A thousand-gallon storage tank was recently hauled to the Frank Shuckman Ranch, generally known as the Mountain House, west of Williams. For a couple of years Shuckman has been using the gas from a well drilled by the Williams Oil Company about twenty years ago, but the storage has not been sufficient to give the best results, therefore a large tank has been installed.

The well drilled by the Williams Oil Company is 1,300 feet deep and is located near the Shuckman home. It is in the oil field of Colusa County and the gas is of the highest quality.

The well being drilled at Sites is also producing a large quantity of gas and gas coming from between the first casing and the first reduction is sufficient for domestic purpose and will likely be used in cooking for the crew and lighting purpose, according to reports.

A. G. A. Reserves Advertising Space in Convention Issue of "Foundry"

New York.—Announcement has just been made that the American Gas Association has reserved two pages in the advertising section of the special American Foundrymen's Association convention issue of "Foundry." The convention is to be held at Chicago, Ill., June 6 to 10.

The Peoples Gas Light & Coke Company, of Chicago, is reserving four pages in the same issue. The six pages, plus that of other interested local gas companies, who are being asked to co-operate, will insure an adequate presentation of the story the gas industry has to tell the foundrymen of the country.

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Meriden-Middletown Gas Line Is Planned

Middletown, Conn. — According to the plans of the interests controlling the Connecticut Light and Power Co., the contract has been let for constructing the proposed pipe line for gas between Meriden and Middletown. This is the first bit of constructive work growing out of the sale of the Middletown Gas Light Co. to that corporation. It is expected that work upon the proposed line will be commenced shortly.

This is part of an extensive development program which the United Gas Improvement Co. has in view, as outlined by President Paul Thompson at the meeting of the stockholders in Philadelphia.

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Pennsylvania Gas Co. Files Petition for Erection of Gas Plants

Albany.—The Pennsylvania Gas Company filed petition with the Public Service Commission for permission to construct a gas plant in the villages of Lakewood and Celoron and the town of Carroll, Chautauqua County, and for the approval of the exercise of local franchises therefor granted by the villages and town mentioned. Public hearing will be held on the petition.

PIPE LINE STARTED

Cities Service Building Natural Gas Project in Texas

Construction work has been started by the Cities Service organization on a natural gas pipe line that will open up the largest known gas reserves in the world, the Panhandle field of Texas, and connect it with the extensive pipe line and distributing system of the Empire Gas and Fuel Company and other Cities Service subsidiaries, according to an announcement by Henry L. Doherty & Co.

This new development is a $15,000,000 project and will make gas from this area available for Kansas City and other important points supplied by Cities Service subsidiaries, including many industrial customers who have hitherto depended on other forms of fuel. The completed pipe line will have a daily capacity of about 100,000,000 cubic feet of natural gas.

* * *

Central Hudson Gas & Electric Corporation Granted Petitions to Extend Gas and Electric Service

Albany. — The Public Service Commission has granted the petitions of the Central Hudson Gas & Electric Corporation for permission to extend its electric and gas service in the town of Newburgh, Orange County, and approved of the exercise of franchises therefor heretofore granted by the respective towns.

The commission also granted the petition of this company for permission to extend its electric and gas service in the town of Ulster, Ulster County, and approved of the exercise of an amended franchise of the town covering both gas and electric service.

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Newcomers Gas Rate Announced

West Philadelphia, O.—Natural gas consumers in Newcomerstown for the next three years will pay $1 for the first thousand cubic feet and 50 cents for each additional thousand.

This was assured by action of the village council when it passed an ordinance fixing the rates.

Walter R. Addicks Addresses Advanced Students of Johns Hopkins

Baltimore, Md.—Walter R. Addicks, senior vice-president of the Consolidated Gas Company of New York, lectured on "The Gas Supply of a Modern City—Today and Tomorrow" before the advanced students in the School of Engineering at Johns Hopkins University on May 5, 1927, appearing in behalf of the Committee on Co-operation with Educational Institutions of the American Gas Association. Mr. Addicks gave a most interesting lecture illustrated by lantern slides and moving pictures.

In the evening he addressed an educational group of the Consolidated Gas Electric Light & Power Company of Baltimore.

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TRUAX WILL HEAD NEW GAS COMPANY

Well Known Delavanite Is Named Manager for Local Territory

Delavan, Wis.—G. E. Truax, representative of the local Hudson-Essex agency and well known in civic and commerical life of Delavan for over thirty years, was appointed local manager of the Southern Wisconsin Gas Company, according to an announcement by A. R. Manley of the public utility firm.

Mr. Truax has resided in Delavan since 1894 and has watched the city's consistent growth with interest. In taking over his new duties he feels that there is a splendid opportunity in the city for the gas company and is confident that the plans will be carried out. Mr. Truax was connected with the Bradley Knitting Company for over fourteen years. He was also connected with the W. W. Bradley Company for a few years.

A survey is now being conducted among householders to determine the consensus of opinion concerning the use of gas. Although the survey has not yet been completed the plan is being well received and it is predicted that the plan will be under way in a short while.

Research Committee Co-operates With Industrial Gas Users

New York.—A "pioneer battalion" has been formed by the Industrial Gas Section of the American Gas Association to hack a pathway through the forest of industrial heat problems. This work has been intrusted to the Research Committee of that section.

No longer is it necessary for a gas company to spend thousands of dollars of its own money in fruitless efforts to devise equipment to suit the needs of its customers. One large company, for example, having expended $5,000 in trying to develop a brass melting furnace, an effort that was a failure for the reason that the appropriation was exhausted before successful results were accomplished. Other splendid efforts along this line have also gone for naught.

Industrial gas engineers now can turn their problems over to this Research Committee for solution. Those problems will be allocated to the proper agency. If the problem is national in scope, it will go to the American Gas Association National Research, which is backed by a $500,000 appropriation of the American Gas Association. If the problem is in line with the specialization of any manufacturer, it will be directed there. Minor problems will be allocated in such a way that the burden will be minimized.

Several problems are already in process of research. A crucible brass melting furnace, mold dryer, and several other appliances have been suggested by industrial gas engineers, and are being developed and, it is hoped, will be a great aid in the industry. More suggestions are in order.

In order that there may be no unnecessary duplication of effort, and that proper records of accomplishment may be kept, it is particularly desirable that industrial gas engineers send in information relative to new developments and gas applications in their own territory.

The value of the gas industry's research facilities and work is dependent upon the co-operation given by the industrial gas men in the industry. It is therefore urged that the suggestion of research problems, as well as information relative to new developments and applications, be sent in to Association headquarters. All communications should be sent to W. D. Thompson, Chairman Research Committee, Industrial Gas Section, American Gas Association, 420 Lexington avenue, New York City.

REDUCED RATES ON GAS

Bessemer and Other Jefferson County Consumers to Get Cheaper Prices

Bessemer, Ala.—Consumers of gas in Bessemer and the unincorporated territory of Jefferson County west of the boundary line of Fairfield will be granted a material reduction in gas rates under an order issued by the Alabama Public Service Commission. The new schedule will be established with the approval of the Birmingham Electric Company, which distributes the gas, and the city council of Bessemer.

The new schedule calls for a rate of $1.50 for the first five hundred cubic feet of gas used and ten cents a hundred cubic feet for any additional amount. It means that a consumer of one thousand feet a month will pay two dollars instead of $2.25, a saving of 25 cents. One who uses as much as ten thousand feet will pay $11 instead of $13.50, a saving of $2.50 each month.

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Fontana Homes Now Have Gas

Los Angeles.—Gas for fuel, light and heat now is available to almost all residents in the townsite at Fontana, more than five miles of mains already having been laid by the Southern California Gas Company, it was announced.

Workmen for the gas concern are extending the system to the ranch area surrounding the townsite, and soon the entire community will be served. Seven miles more of pipe lines remain to be laid to complete the system.

Tag Opens Cleveland Branch Factory

The C. J. Tagliabue Manufacturing Company, of Brooklyn, N. Y., maker of industrial instruments, has opened a branch factory at 5902 Carnegie Avenue, Cleveland.

This development has come about through the desire of Tagliabue to provide the utmost in quick service and to cut down freight and express charges for the benefit of users of Tag instruments in Ohio, Western Pennsylvania, Indiana and Michigan.

The recent growth of the Tag business in that region has made the opening of a branch factory a necessity.

The prime function of the new factory will be repair work, with special attention to emergency orders. The repair facilities of the main factory in Brooklyn have been nearly duplicated, in special equipment, in trained personnel, and in other respects, except only that of size.

In addition to repair facilities there will be maintained stocks of all standardized instruments.

The Tag Cleveland factory is in charge of District Manager A. R. Anderson. Messrs. F. A. Denz, F. L. Frock and F. Cramer have also been assigned to special work at the Cleveland factory. The telephone number is Randolph 7265.

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Western Gas Construction Company Receives Contract to Install Water Gas Machine

The Consolidated Utilities Company of Bismarck, N. D., have placed contract with The Western Gas Construction Company for a new six-foot water gas machine to be installed at their plant at Bismarck.

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G. C. Carnahan Joins James B. Clow & Sons Organization

Chicago.—G. C. Carnahan, formerly manager of the Heating Section of the Peoples Gas Store, Inc., has recently accepted the position of manager of the Gasteam Radiator Department of James B. Clow & Sons, Chicago, Ill.